National Energy Board
Office national de l'énergie

Energy Facts

December 2010

Canada's Top Energy Stories of 2010

Due to the dynamic nature of our energy system, there is always a lot for Canadians to talk about when it comes to energy. This year, to encourage that discussion, the NEB has produced summaries of what it views to be the key energy stories in 2010. Below, in no particular order, is a list of significant national and regional events that had important immediate or potentially enduring impacts on Canada's energy future.

The NEB Approves the Mackenzie Gas Project

In December, the National Energy Board announced that it had approved the Mackenzie Gas Project, the biggest development ever proposed for Canada's North.

U.S. Gulf Coast Disaster Prompts NEB Arctic Offshore Drilling Review

Many Canadians were concerned as one of the largest oil spills the world had ever seen unfolded over the summer of 2010. In light of the spill, the NEB announced it would conduct a review of Arctic safety and environmental offshore drilling requirements.

Low Natural Gas Prices and Better Opportunities in Oil Lead to Less Natural Gas Production in Canada

Canadian natural gas production continued its four-year decline as producers drilled fewer gas wells because of low gas prices and more attractive opportunities in oil. Costs for oil and gas services and labour also appeared to be increasing by year-end, likely contributing to the decline.

Atlantic Provinces Explore Opportunities to Share Power

Agreements between the Atlantic Provinces for cooperation in regional electricity development has resulted in plans for new electricity transmission projects and plans to start developing the significant hydroelectric potential in the Lower Churchill region of Labrador.

Shale Gas Brings New Opportunities and New Challenges

Production of shale gas in both the U.S. and Canada increased rapidly in 2010, unlocking a massive new energy resource. Accompanying the growth were concerns from some stakeholders about the effect of the drilling on the environment, particularly water use and groundwater quality.

Pipeline Ruptures in North America Increase Focus on Safety

Pipeline ruptures in the U.S. highlighted the importance of pipeline integrity to public safety and the environment.

Global Interest in the Canadian Energy Sector

In response to their rapidly growing demand for energy, many Asian countries made investments in several Canadian energy projects in 2010.

New Transportation Fuel and Emissions Standards

Jointly with the U.S., Canada introduced more stringent emission standards for passenger vehicles produced between 2011 and 2016. Both countries also enacted renewable fuel regulations for transportation fuels.

Global Economic Growth Leads to Increased Energy Prices and Energy Export Revenues

The rapid increase in shale gas production kept a lid on natural gas prices in 2010, benefiting homeowners with relatively low natural gas prices. While oil prices increased slightly from 2009 resulting in Canadian drivers paying slightly more at the pump.

Increasing Oil Sands Activity and Environmental Scrutiny

A number of oil sands projects put on hold during the global economic crisis resumed in 2010. While production

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increased, so did scrutiny from environmental stakeholders, domestically and abroad.

Increasing Substitution of Coal Generation by Cleaner Sources

Federal and provincial efforts combined to encourage the replacement of coal electric generation capacity with cleaner technologies, primarily with natural gas-fired plants. There were also significant efforts to encourage the use of renewables.

The NEB Approves the Mackenzie Gas Project

In 2010, the National Energy Board announced that it had approved the Mackenzie Gas Project, the biggest development ever proposed for Canada's North.

The project includes the 1,196-kilometre long Mackenzie Valley Pipeline, three onshore natural gas fields, a 457-kilometre pipeline to carry natural gas liquids from Inuvik, NWT to an existing oil pipeline at Norman Wells, NWT and other related facilities. The Mackenzie Valley Pipeline would run from the Beaufort Sea to northwestern Alberta, and is designed to carry up to 34.3 million cubic metres (1.2 billion cubic feet) of natural gas per day. This is enough to supply about two-thirds of the six million Canadian households that used natural gas to heat their homes in 2009. Imperial's latest estimate, released in 2007, pegged costs for the project at $16 billion.

The NEB began hearing evidence in January 2006 and final argument was completed in April, 2010. In total, the Board held hearing sessions over 58 days in 15 communities throughout the Northwest Territories and Northern Alberta. More than 200 individuals and organizations participated in the NEB's hearing.

If the companies decide to build the project, it will have important economic benefits for Aboriginal people, for Northern residents and for all Canadians. This would include employment, contracting and business opportunities, a higher level of economic activity, labour income and tax revenue.

The Board's decision was accompanied by more than 250 conditions in areas such as safety, environmental protection and engineering. You can read the Mackenzie Gas Project decision here. http://www.neb-one.gc.ca/clf-nsi/rthnb/ppictnsbfrthnb/mcknzgsprjct/rfd/rfd-eng.html

U.S. Gulf Coast Disaster Prompts NEB Arctic Offshore Drilling Review

On 20 April 2010, an explosion on the Deepwater Horizon rig operated by Transocean Ltd. and drilling at BP's Macondo Project in the Gulf of Mexico caused the rig to sink and killed 11 workers. Oil flowed into the sea from the well for 87 days until July 15, when the leak was stopped by capping the gushing wellhead. The well leaked over 4.9 million barrels of oil, making this the largest oil spill in American history—16 times the amount the Exxon Valdez spilt near Alaska in 1989.

Canadians want to be assured that all is being done to prevent a similar event in our own country. In response to this disaster, the NEB initiated a review of the safety and environmental requirements for offshore drilling in Canada's unique Arctic environment. The Review will examine the best available information concerning the hazards, risks and safety measures associated with offshore drilling activities in the Canadian Arctic. The Board will also consider additional measures to both prevent and respond to accidents and malfunctions. More information on the Arctic Offshore Drilling Review is available on the NEB website.

Low Prices and Higher Costs Lead to Less Natural Gas Production in Canada

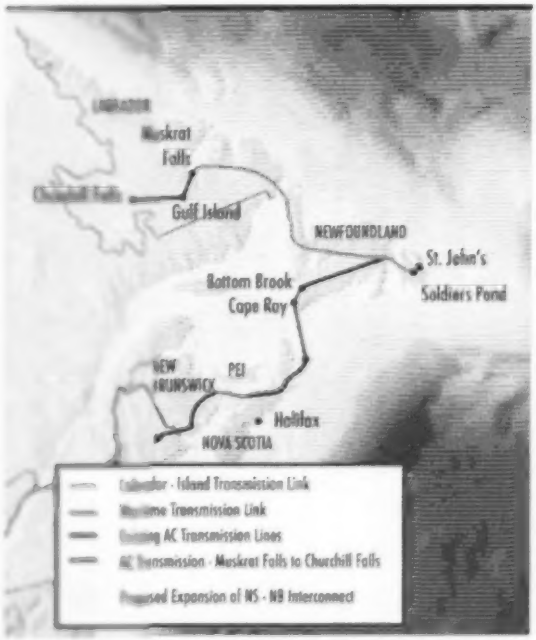
Canadian natural gas production declined in 2010, continuing the trend that began in 2007. Production averaged about 14.4 Bcf/d, by the end of November, down about five per cent from 2009 and 14 per cent from 2007. Low gas prices discouraged gas drilling and many companies shifted drilling towards oil because of higher oil prices, substantially reducing the number of new gas wells drilled. By end of November, a number of producers had shut-in some of their production with plans to turn on the taps again once prices increase from the current low levels. Additionally, while Western Canadian gas-production costs in 2009 were lower than 2007 as described in a recent NEB Energy Briefing Note, some costs were rising by late 2010. Higher oil activity led to increased prices for well-completion services as well as higher wages for skilled labour.

In a related event, the Alberta government revamped its royalty regime in early 2010 to increase oil and gas development, though the new royalties are scheduled to come into effect in January 2011. The Alberta government raised $2.4 billion through auctions for oil and gas rights in 2010, excluding oil sands, breaking the previous record of $1.8 billion set in 2005.

Atlantic Provinces Explore Opportunities to Share Power

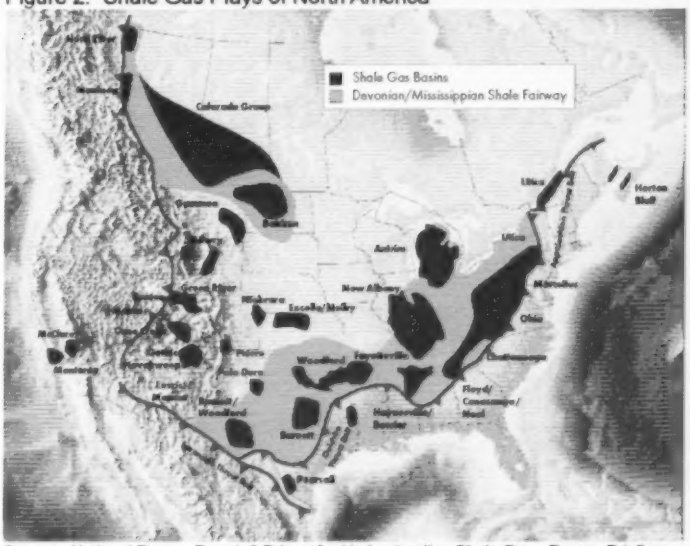
On 13 July 2010, the governments of Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland and Labrador signed an agreement to act together on energy development, particularly on projects that could move energy beyond their borders. This includes the previously stagnant Atlantic Energy Gateway Initiative, and led to agreements that involve building a new transmission line between Nova Scotia and New Brunswick, an additional subsea cable from P.E.I. to New Brunswick, and subsea lines connecting Labrador with Newfoundland and Nova Scotia. These agreements should help the region begin developing the significant hydroelectric potential in the Lower Churchill region of Labrador. In this region there are two sites identified for large hydro dams; the Muskrat Falls site is scheduled to be built by 2017 and could produce about 825 megawatts of power, while the Gull Island site would be about three times the size but is not a definitive part of these agreements. More information on the development of this $6.2 billion Lower Churchill Project is available on the Government of Newfoundland and Labrador's website.

Figure 1: Map of Proposed Island transmission Link and Maritime Transmission Link



Source: Government of Newfoundland and Labrador website.

Figure 2: Shale Gas Plays of North America



Source: National Energy Board, A Primer for Understanding Shale Gas - Energy Briefing Note

Shale Gas Brings New Opportunities and New Challenges

Shale gas production increased substantially in 2010, more than offsetting declines in conventional production to push North American gas supplies to record highs. Some estimates have shale gas at 20 per cent of U.S. gas production, up from five per cent just a few years ago. In particular, traditional pipeline flows in North America are shifting in response to Marcellus Shale production in the northeast U.S. This new production has reduced Canadian natural gas exports from the west through Ontario and Quebec into New York State and has the potential to reverse the flow on lines from Ontario and Quebec into the U.S. The Ontario Energy Board is evaluating current and potentially new sources of natural gas for Ontario markets to ensure the most competitive prices through its *2010 Natural Gas Market Review.*

However, shale gas development is raising some questions with local stakeholders. In New York State, Pennsylvania, and Quebec, there was considerable resistance to increased gas drilling. In Quebec, the Bureau d'audiences publiques sur l'environnement (BAPE) began a public inquiry into the sustainability of developing the Utica Shale. The inquiry examined public concerns such as water use and the risk of groundwater contamination through hydraulic-fracturing operations. Information on the Ontario Energy Board Review and BAPE inquiry is available on their websites.

Pipeline Ruptures in North America Increase Focus on Safety

Pipeline ruptures in the U.S. had Canadians turning their attention to the importance of pipeline safety. In July, an Enbridge pipeline in southern Michigan spilled over 18,000 barrels of crude into the Kalamazoo River. The rupture shut the line for nine weeks. Less than two months later, another line leaked in the Chicago area with approximately 6,100 barrels of oil released, shutting down the 670,000 barrel per day pipeline for eight days.

Pipeline Inspectors
Source: NEB

Further incidents in November had Enbridge again shutting down one of its lines as a precautionary measure, and an additional shutdown of Line 6B which delivers crude oil from Griffith, Indiana to Sarnia, Ontario. Enbridge also encountered further disruptions because of a power outage in Illinois.

This impacted Canadian crude oil shipments, causing apportionment on the pipelines that transport crude oil to export markets and reducing prices for Canadian crude oil. Apportionment occurs when shippers want to ship more oil than the pipeline can transport at any given time, either during normal operations, or when capacity is reduced in a situation like this.

On 10 September 2010, a natural gas pipeline exploded in San Bruno (a suburb of San Francisco), California killing eight people and destroying 37 homes and damaging others. The pipeline is operated by Pacific Gas and Electric Company, California's largest utility owner.

This has caused Canadians to consider safety on this side of the border. The safety of NEB regulated infrastructure is the number one priority for the NEB. The Board is continually working to enhance pipeline safety and these recent incidents in the U.S. have reaffirmed the need for continued diligence.

As part of its risk based approach and ongoing monitoring the NEB required Enbridge to evaluate its integrity program in light of the recent incidents in the U.S. and it is actively following-up with the company. The NEB is committed to learning from all incidents, and revising regulatory requirements and compliance activities as appropriate.

More information on the National Energy Board's role in ensuring the safety of Canadian facilities is available here.

Table 1: Foreign Acquisitions in Canadian Energy

Foreign Investors	Canadian Counterparties	Asset	Value ($Cdn)	Commodity
Sinopec International Petroleum Exploration Company	ConocoPhillips	Syncrude mining operation	$4.65 billion	Oil sands
Apache Corporation	British Petroleum Plc	oil and natural gas upstream assets	$3.4 billion	Crude oil and natural gas
Thailand's PTT Exploration and Production	Statoil's Canadian Oil Sands Project	Canadian Oil Sands Project	$2.3 billion	Oil sands
Total E&P Canada	Suncor Energy Inc.	Joint ventures in Fort Hills and Joslyn Oil Sands Projects and Voyageur upgrader	$1.7 billion	Oil sands
Total E&P Canada	UTS Energy Corporation	Main asset is 20 per cent interest in the Fort Hills Oil Sands Project	$1.5 billion	Oil sands
Harvest Energy Operations (A wholly-owned subsidiary of Korea National Oil Corporation)	BlackGold Oil Sands Project	BlackGold Oil Sands Project	$374 million	Oil sands
China Investment Corporation (CIC)	Penn West Energy Trust	bitumen assets located in the Peace River area of northern Alberta	$817 million	Oil sands
Mitsubishi Corporation 50/50 joint	Penn West	shale gas assets in the northeastern British Columbia	50/50 Joint Venture	Natural gas
Samsung and the Korea Electric Power Corporation	The Province of Ontario	Development of wind and solar power projects	$6.6 billion	Electricity
Korea National Oil Company	Hunt Oil	Canadian oil and gas assets	$525 million	Crude oil and natural gas

Source: Nickel's Daily Oil Bulletin

Global Interest in the Canadian Energy Sector

It has been a busy year for foreign acquisitions of Canadian oil and natural gas assets or companies with 15 major deals worth about $23 billion. Asian companies were responsible for about three quarters of that investment. Additionally, there were electricity-related investments made between Asian and Canadian parties, in particular a $6.6 billion agreement for the development of new wind and solar power projects in Ontario. Foreign investment in Canadian energy can create jobs, inject capital into the economy and stimulate development of new technology. Table 1 below lists some of these major agreements with foreign counterparties.

New Transportation Fuel and Emissions Standards

The Canadian government enacted its Renewable Fuel Regulations on 1 September 2010. The regulations set minimum volumes of renewable fuels in transportation fuels that must be included in Canada. The regulations came into effect on 15 December 2010 with a five per cent renewable fuel content requirement for gasoline. A two per cent renewable content requirement for diesel fuel and heating oil will be put in place in 2011.

In addition, on 1 October, Canada and the U.S. jointly announced new emission standards for light-duty passenger vehicles. The final standards are based on greenhouse gas (GHG) emission performance and are set to become progressively more stringent for 2011 to 2016 model vehicles. Because of the regulations, Environment Canada projects that the average GHG emission performance of new vehicles for the 2016 model year will be about 25 per cent lower than the vehicles sold in Canada in 2008. An important part of meeting these emission standards will be improvements in vehicle fuel efficiency.

The regulations will help Canada reduce its GHG emissions in the transportation sector, which accounts for about a quarter of GHG emissions.

Global Economic Growth Leads to Increased Energy Prices and Energy Export Revenues

The energy industry is an important contributor to Canada's economy, and economic conditions are an important driver of energy demand and prices. While Canada's economy grew by over three per cent in 2010, emerging economies, such as China and India, experienced much higher growth rates. One of the primary factors driving up global oil prices is the increasing demand in markets like China and India.

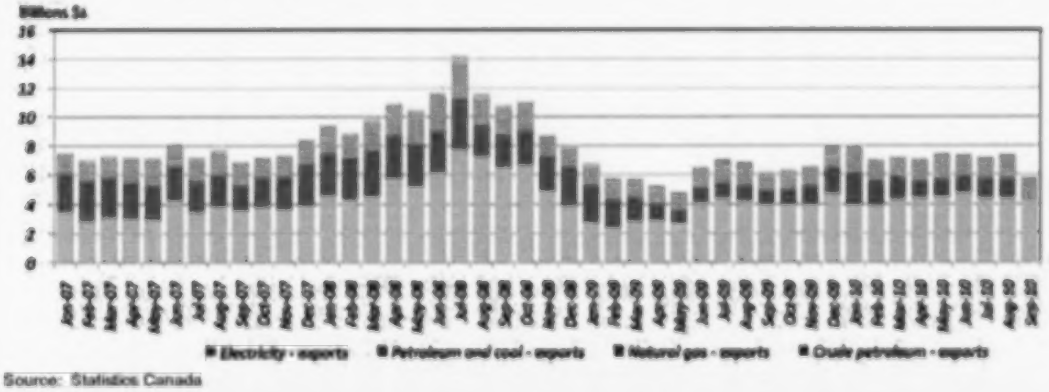
In December 2010, the price of crude oil reached almost US$90 per barrel. On average, crude oil prices have risen about 30 per cent compared with last year. This rising oil price has contributed to gasoline prices being about nine per cent higher for Canadian consumers compared to 2009. More information on Gasoline Pricing is available on our website. The chart below shows that prices of other commodities, such as natural gas and electricity, increased in 2010.

Table 2: Energy Prices

	January to November Average		Per cent Change
	2010	2009	2009 to 2010
WTI Crude oil (US$/barrel)	78.65	60.63	+29.7%
NYMEX natural gas (US$/MMBtu)	4.41	4.06	+8.7%
Retail gasoline – national average (C¢/litre)	102.9	94.4	+9.0%
Wholesale electricity – Ontario on-peak (C$/Mw.h)	42.30	36.87	+14.7%

Higher energy prices in 2010 were an important factor in rising energy export revenues. From January to September, energy export revenues were almost 20 per cent higher than the same

Figure 3: Value of Energy Exports



Source: Statistics Canada

period in 2009. While rising energy export revenue benefits Canadians, increasing energy prices mean that it cost consumers more to heat their homes and drive their cars.

In 2010 oil prices increased because of the continuing growth of oil demand in Asia. China led oil demand growth at about 11 per cent and accounts for roughly 40 per cent of the growth in global oil demand. Growth in Asian markets is creating interest from the Canadian oil and gas industry to ship crude oil and natural gas to those markets.

Increasing Oil Sands Activity and Environmental Scrutiny

The oil sands remained a high profile part of Canada's energy system, both domestically and internationally. In 2010, total oil sands production surpassed 1.5 million barrels per day, about 50 per cent higher than in 2005 when it first reached the 1 million barrel per day mark. Oil sands crude oil now accounts for 55 per cent of crude oil production in Canada.

The debate on the environmental impact of oil sands development continued in 2010. The primary concerns were tailings ponds, water quality and greenhouse gas emissions. In June Syncrude was charged under the *Alberta Environmental Protection and Enhancement Act* and the *Federal Migratory Birds Convention Act* with failing to protect migratory birds from a toxic tailings pond and fined $3 million for negligence in the death of 1,600 ducks in tailings ponds. Since the incident, Alberta's energy regulator has imposed more stringent rules for new tailings ponds, forcing the industry to develop new technologies for reducing and reclaiming them.

In October, an additional 200 birds perished after landing in tailings ponds operated by oil sands producers. This unusual bird activity was due to weather in the area that made it difficult for the birds to fly. The companies said that its waterfowl deterrent system was in full operation, as well, extra air cannons, flare guns and horns were used in an attempt to scare the birds away from the area.

In 2010, Suncor announced an industry milestone by being the first company to restore tailings ponds to a natural landscape. Surface reclamation has been completed and has entered the restoration phase. Over the next 20 years, Suncor will monitor the site and growth of shrubs and trees planted in 2010. Suncor received regulatory approval to put into action its tailings reduction operations (TRO). Tailings reduction operations (TRO) have the potential to reduce tailings reclamation time by decades, speeding the return to a natural habitat.

Seven oil sands' companies have announced that they intend to cooperate to advance tailings ponds management through innovation and collaboration in research and development related to tailings.

In 2010, the "No Tar Sands Oil Coalition" was launched, calling on U.S. President Barack Obama to reject the TransCanada Corporation's proposed Keystone XL pipeline which would transport Canadian crude oil to the U.S. Gulf Coast. The coalition is supported by an international network of environmental, citizen and indigenous groups.

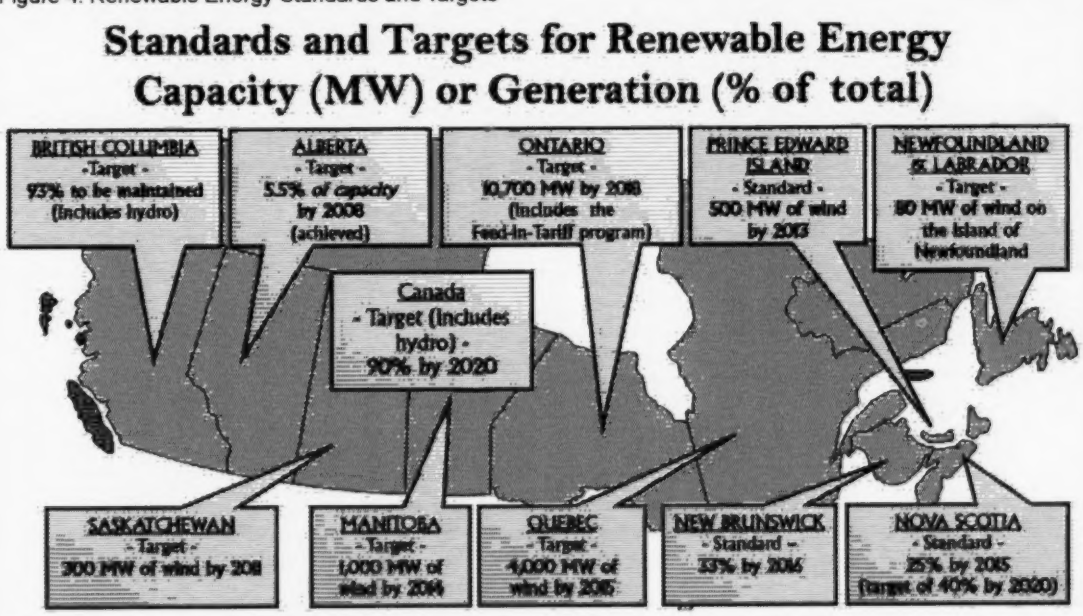
On 30 September, Environment Canada appointed an Oil Sands Advisory Panel. The Panel was created in response to concerns about industrial pollution in the Athabasca River and connecting waterways. The Panel has a mandate to advise the Minister of the Environment on the current state of environmental research and monitoring in the region around Alberta's oil sands and to make recommendations to ensure that state-of-the-art monitoring and best practices are implemented.

Increasing Substitution of Coal Generation by Cleaner Sources

In 2010, over 2200 megawatts of coal-fired capacity was retired in Canada. The bulk of these retirements were in Ontario while Alberta retired one of its oldest units. The capacity that has been built to replace coal generation is mostly gas-fired; however, the plans and regulations that were either started or advanced in 2010 are calling for significant renewable generation in the future.

Ontario's feed-in-tariff (i.e. guaranteed rates for renewable generation) started in late 2009. Since then, it has contracted for over 2500 megawatts of new renewable capacity. This past year both B.C. and Nova Scotia created new legislation intended to increase renewable generation. B.C. will increase its renewable generation to 93 per cent of total consumption and maintain this level. One of the major drivers for Nova Scotia's

Figure 4: Renewable Energy Standards and Targets



Source: National Energy Board, Canadian Wind Energy Association and various Provincial government websites

plan, which made a legal renewable energy standard of 25 per cent by 2015, is to decrease the province's reliance on imported coal for power generation. Additionally, the Federal Environment Minister indicated his intent to develop policy that would come into effect in 2015 and would prohibit the construction of new coal plants or the refurbishments of old plants (≥45 years of service) unless the operator installs carbon capture and storage technologies. This policy would support the Federal government's target for non-emitting generation to be 90 per cent of consumption by 2020.